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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,146	11/26/2001	Min-Su Kim	SAM-0274	8596

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EXAMINER	
HU, SHOUXIANG	

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/994,146	KIM ET AL.	
	Examiner	Art Unit	
	Shouxiang Hu	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 18-36 are objected to because of the following informalities and/or defects:

Claims 18 and 36 each recite the term of "the conductive layer", but fails to clarify which of the two conductive layers ("conductive layer" and "gate conductive layer") it definitely refers to.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 28-36, rejected under 35 U.S.C. 103(a) as being unpatentable over Tyson (US 5,317,181) in view of Cherne (US H1435; of record).

Tyson discloses a semiconductor device (see Figs. 1-3) having an SOI structure, comprising: an insulating layer (34; oxide); an insular silicon region (P-; inherently a single crystal layer) including an insular body region (18, P-), a channel (32); a gate oxide layer (34); a gate conductive layer (12); a heavily doped body contact region (22 and/or 24), a source region (14; n+); a drain region (16; n+); a source conductive layer

(26; TiSi, a salicide), wherein the body contact region being in contact with and connected to the source region and the insular body region, and the heavily doped body contact region does not overlap with the gate.

Although Tyson does not expressly disclose that the gate conductive layer can also be covered by a salicide layer formed together with, but positionally separated from, the source conductive layer, one of ordinary skill in the art would be readily recognize that the gate conductive layer, the source region and the body contact region can all be desirably covered by a (salicide) conductive layer comprising a same metal silicide layer with separated regions formed during a same salicide process for reducing the respective interconnection resistance, as evidenced in Cherne (see Figs. 9 and 10). The conductive layer (95) in Cherne comprises separated first and second portions, wherein the first portion covers the gate conductive layer (21), and the second potion covers the source region (16) and the body contact region (72, 74, and/or 76); and the source electrode is connected to the source region (N+ SOURCE) through the second portion of the conductive layer (95).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporate the (salicide) conductive layer of Cherne into the semiconductor device of Tyson, so that a MOSFET device reduced interconnection resistance would be obtained.

Regarding claim 36, the MOSFET in Tyson can also be formed as a P-channel MOSFET (see col. 6, lines 48-49), which would be naturally have a P-type source region and an N-type channel region.

3. Claims 18-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyson in view of Cherne, as applied to claims 28-36 above, and further in view of Bahraman (US 5,001,528).

The disclosures of Tyson and Cherne are discussed as applied to claims 28-36 above.

Although Tyson and Cherne do not expressly disclose that the geometry of the source structure can be symmetrical to that of the drain structure in the sense that they have a same width and a same length, one of ordinary skill in the art would readily recognize that such a symmetry can be readily and desirably formed for achieving maximum effective channel width with structure simplicity, as evidenced in Bahraman (see the substantially symmetrical source region (2a) and drain region (2b) in Figs. 1-3).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporate the symmetric source/drain structure of Bahraman into the semiconductor device collectively taught by Tyson and Cherne, so that a MOSFET device with maximum effective channel width and structure simplicity would be obtained.

Regarding claim 23, the extended gate electrode portion in Fig. 1 of Tyson can be regarded as the recited gate electrode. And, a drain electrode is also always naturally included in a MOSFET, as shown in Fig. 10 of Cherne).

R spons to Arguments

4. Applicant's arguments filed on February 17, 2004 have been fully considered but they are not persuasive.

Applicant's main arguments include: the applied prior art references fail to teach the recited feature that the recited conductive comprises a plurality of separated portions. In response, it is noted that, as shown in Figs. 9 an 10 in Cherne, the conductive layer (95) therein comprises separated first and second portions, wherein the first portion covers the gate conductive layer (21), and the second potion covers the source region (16) and the body contact region (72, 74, and/or 76); and the source electrode is connected to the source region (N+ SOURCE) through second portion of the conductive layer (95). It demonstrates that the ordinary skill in the art would readily recognize that the gate conductive layer and the source/body contact region can be both desirably covered by separated portions of same (silicide) conductive layer formed during a same salicide process for reducing the respective interconnection resistance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH
May 19, 2004

SHOUXIANG HU
PRIMARY EXAMINER